westerly station in Europe from which the phenomenon has been observed with some approach to accuracy; and if the centre of the corona be, as it seems to be (*pace* some of your correspondents), an actual, substantive point, and not merely the effect of perspective, the following observations may help in determining its height above the earth. At 11.0 exactly, Greenwich time, the centre of the very well developed corona had an altitude of 68°, with an azimuth bearing of 21° E. of S., a little W. of magnetic S. (these measurements being taken as correctly as could be done with a good-sized compass furnished with a clinometer), and it was distant from α Lyræ (*Vega*) about 8° towards S.W.; this distance being afterwards diminished by the rotation of the earth. The aurora was observed independently by Messrs. Kinahan and Symes, of the Irish Geological Survey, in the same neighbourhood, and they also noted the proximity of the centre to the above-mentioned star. I do not trouble you with other details.
M. H. CLOSE

Newtown Park, Black Rock, Dublin, July 13

I WITNESSED last night what must have been a somewhat brilliant display of aurora. From 10.45 P.M. to 11.0 P.M. slight breaks in the N.E. were brightly lit up with a rosy glare, and another break in the N. with the green rays. Coruscations of light flashed up from time to time, and were visible even through the clouds, which consisted of somewhat dense nimbus. The display in a clearer sky must have been decidedly fine.

Bridport, Dorset, July 8 J. EDMUND CLARKE

Registering Thermometer

MR. WHIPPLE and Mr. Bushell have shown great ingenuity in suggesting remedies for the copious condensation of moisture which takes place in the interior of the jackets of minimum thermometers on the grass.

Both their suggestions I have found fail to work a permanent cure; the chloride of calcium (only of use when the stopping is perfect) soon becomes super-saturated, and itself gives off moisture. The putty and sealing-wax hold good for about five or six months, and then the insidious moisture permeates again. Would it not be better to adopt my very simple plan of discarding the jacket altogether? It is absolutely useless, and no stopping is really effectual in resisting for long the daily extremes of heat and cold and damp and dryness these thermometers must undergo.

I have used a thermometer on the grass for the last three years entirely unmounted, and find its indications in no way effected by the loss of its outer coat.

CHARLES H. GRIFFITH

The Rectory, Stratfield Turgiss, Winchfield, Hants,
July 5

Luminous Matter in the Atmosphere

I WAS much interested by M. Waldner's short article on "Luminous Matter in the Atmosphere" in the number of NATURE for Feb. 15, 1872. Being unable to see the particles described, I applied to him for further directions, and he was kind enough to inform me that they may be seen *à vision directe* with a telescope.

I have since found that many of the little bodies may be seen with the naked eye by shutting out the powerful direct and lateral rays. This may be done, *e.g.*, by partly closing the *jalousies* or outside shutters used here, and then looking for the particles at about the distance of quarter of a degree, or of the sun's radius from the border of his disc, when the sun is either just below the upper edge of the shutter, or immediately above the ledge of the house if it looks east and west. Shutters are not always necessary. I have just seen great numbers by standing on the border of the shadow thrown by the adjoining house. Even by holding my hat over my head I can perceive some of them. The chief object to be aimed at is to prevent the eyes from being dazzled by the direct rays of the sun. The same principle explains the reason why stars are sometimes seen during the day from the bottom of a well or through a telescope, and why the red protuberances of the sun become visible during an ordinary or artificial eclipse.

On the 9th and 10th current, and again this morning, there was a haziness round the sun, which gradually diminished as the angular distance from his disc increased, until the sky became beautifully blue at an angle of 25° or 30°. I found that the haziness was produced by the reflection of the sunbeams from innumerable little particles. Many of them were distinctly visible to the naked eye, but many more were seen with an opera-glass or telescope. They passed too rapidly to be counted, but fifty at least were in the field of my glass at one time. I am sure that this is no optical delusion, for several of my friends have seen them too.

What were these little particles? M. Waldner supposes them to be crystals of ice, and they certainly look like miniature snowstorms. Perhaps some of your readers may be able to decide whether the higher particles are composed of ice-like cirri, the loftiest of the clouds. But some of the corpuscles of the lower strata of the air are undoubtedly seeds, little organic substances, insects, &c. I have caught several feathery little seeds of this kind. They are almost imperceptible when seen against some white substance, and are so light that the slightest currents of air waft them to great distances.

Another instance of numberless little vegetable substances being blown here may be cited, namely, the pollen of the pine trees growing on the Landes. An unusually large quantity of this fell here on April 17, 18, 19, and 20, and may probably be traced to three extensive fires of pine woods sixty or eighty miles N.W. of Pau (April 14-16). The pollen was doubtless drawn upwards by a strong current of heated air, and then wafted to Pau by the wind, which blew in the right direction (April 17-19). The wind changed at Bordeaux on the 20th, and the pollen then fell (April 21-22) near Perigueux, nearly as far to the N.E. of the fires as Pau is to the S.E. A correspondent of the *Times* (April 30), mistaking the pollen for sulphur, announced that a shower of this substance had fallen here, and supposed that it was connected with the eruption of Vesuvius, which, however, did not begin until the 24th.

I would suggest that some record should be kept of the direction of the wind which these particles indicate in different strata of the atmosphere in fine weather. J. F. ANDERSON

4, Place Duplace, Pau, June 12

Vibration of Glasses containing Effervescing Liquids

IT is known that a glass containing effervescing liquid will not give a clear note when struck, and that as the effervescence subsides the tone becomes more and more clear. When the liquid is perfectly tranquil the glass will ring as usual, but on re-exciting the effervescence the musical tone again disappears. Sir John Herschel (Encyc. Met., Art. "Sound"), who states that this experiment appears to have been originally made by Chladin, quotes it as an "example of the stifling and obstruction of the pulses propagated through a medium, from the effect of its non-homogeneity;" and, in explanation of the phenomena, he says:—"We must consider what passes in the communication of vibrations through the liquid from one side of the glass to the other. The glass and contained liquid, to give a musical tone, must vibrate regularly in unison as a system; and it is clear, that if any considerable part of a system be unsusceptible of regular vibration, the whole must be so."

The phenomenon, then, according to this explanation, is due to the fact that the liquid, during effervescence, becomes non-homogeneous, and thus obstructs the passage of the sonorous vibrations from one side of the glass to the other.

It is with much diffidence that I venture to express dissent from so eminent an authority as Herschel; but it does not appear to me that the above explanation is entirely satisfactory, for the following reasons:—

1. It seems probable that the sonorous vibrations pass *round* the glass rather than *across* it. For, if they pass across the glass, that will occur whether it contains water or air. Yet the musical tone of a glass containing air is not destroyed by suspending within it, so as not to touch it, a ball or cylinder of wool or cotton, although the sonorous vibrations certainly cannot pass freely through that substance.

2. If the non-homogeneity of the contained liquid be the cause why the sonorous vibrations will not pass, whence comes it that treacle, clear honey, &c., which are homogeneous fluids, destroy the musical ring of a glass fully filled with any of them?

The phenomenon presents itself to my mind as being due to a certain amount of vibration communicated to the glass by the agitation arising from the effervescence. This vibration—which can be easily heard by placing the ear close to the glass—interferes with that caused by striking the glass, and destroys more

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or less the proper rhythmic movement necessary to the production of a musical note, according as the intensity of the agitation of effervescence is greater or less.

The dead sound of a cracked glass is probably owing to a similar cause. For in that case, as soon as the vibrations travelling round the glass arrive at the crack, the edges of which are wholly or partially in contact, they are transmitted from edge to edge, and as, owing to the friction of the edges one against the other, their vibrations do not synchronise, a reflex wave is impinged upon each, having a less velocity than the original wave. This reflex wave will correspond to the vibrations caused by effervescence. If the crack be cleanly cut out, so as to separate the edges by a well-defined interval, the glass will again emit a musical note. In the latter case, the sonorous vibrations, on arriving at the cut portion, return by the way they came, synchronising with those which they meet.

The dead sound of the glass, when filled with honey or treacle, is probably owing to the circumstance of these fluids being not sufficiently mobile to vibrate in unison with the glass; and thus they destroy its musical tone as effectually as if they generated an independent and non-synchronous vibration.

London, July 4 ALLEN BEAZELEY

The Names Cambrian and Silurian in Geology

WILL you allow me to express, as an humble worker among the rocks of North Wales, my sense of the high value of the contributions to your pages recently by Prof. Sterry Hunt on the "History of the names Cambrian and Silurian in Geology?" I have long felt—and have not hesitated to express my feeling—that a great wrong was done to Prof. Sedgwick when the North Wales groups of rocks from the Bala Beds to the Lingula Flags —the order of which he was the first to unravel in that difficult region—were unceremoniously engulphed in Siluria.

It has also appeared to me one of the greatest anomalies in English geological classification, that the magnificent and well-defined groups of North Wales should be typified by their attenuated and broken easterly outcrops in the Silurian district of South Shropshire. What Llandeilo section of Siluria is there that worthily represents the Arenig and lower Bala rocks immediately east or west of the Berwyn Mountains? What Caradoc section of Siluria is there at all worthy of the fine series of the Upper Bala rocks of Glyn Ceiriog? Of the unworthiness of the schists near the Stiper stones to represent the Lingula beds of North Wales, Prof. Hunt justly speaks in his papers.

I am glad that justice seems at last likely to be done to the veteran, Prof. Sedgwick, than whom a more philosophical geologist I am persuaded does not exist. Let but a sufficient number of scientific men resolve to use his older and truer, because more natural classification, and the justice will soon be complete.

D. C. DAVIES

ON THE VARIATION OF SPECIES AS RELATED TO THEIR GEOGRAPHICAL DISTRIBUTION, ILLUSTRATED BY THE ACHATINELLINÆ

IT has long been known that island species are usually different from, but allied to, those of the neighbouring continents. Darwin has also made us familiar with the fact that each of the Galapagos Islands has a fauna, and to some extent a flora, of its own. Other explorers have called attention to the somewhat limited distribution of species in the West Indies and on other islands. I have been informed by Mr. T. Bland, who has given special attention to the terrestrial molluscs of the West Indies, that if Cuba should be divided into two islands by the submerging of the central portion, about half of the species on either of these islands would be different from those on the other. Some of the most remarkable facts of this kind appear in the distribution of the Achatinellinæ on the Sandwich Islands. As they have never been fully recorded, I make the following brief statement of the leading facts, gathered from the results of personal exploration, and suggest a few inquiries.

Many types of the Sandwich Island Helicidæ have at different times been classed under the generic name of *Achatinella*. These widely differing forms have, in the structure of the shell, one point of correspondence that holds them together. The columella has a spiral twist which is more or less apparent in all. In most of the species this character is so strongly developed that the columella seems to be armed with a lamellated tooth revolving within the shell. This common characteristic, in connection with the fact that they are all confined within the limits of one small geographical area, affords sufficient reason for regarding even the most divergent of these types as belonging to one group. As the humming birds are peculiar to America, so the Achatinellinæ are peculiar to the Sandwich Islands.

Though the forms thus brought together evidently constitute a natural group, it has long been apparent that they should be classed under more than one generic name. Some of these genera are restricted to one or two islands.

Genera on Kauai

Several large turreted species of a peculiar type, found only on the island of Kauai, had been provided for at different times under the names of *Achatina*, *Achatinella*, and *Spiraxis;* but no resting-place was found for them till shelter was provided under the separate name of *Carelia*, given by H. and A. Adams. *Carelia turricula*, a species which is sometimes three inches in length and about an inch in diameter, may stand as the representative of this genus. Besides the six or eight species of *Carelia* which have been described, there are many other species of land shells peculiar to this island, the most northern and western of the group. Some of these are *Helices;* the others belong to *Amastra* (H. and A. Adams) and *Leptachatina* (Gould), two genera which are also represented on the other islands of the group. None of the species of this island present any of the brilliant colours that are so common in the shells of Oahu. The peculiar forms of some of the species, as of *Amastra Kauaiensis* and *Carelia cumingiana*, as well as the relations of these aberrant types to the types found on the other islands, render them objects of great interest.

Genera on Oahu

On the island of Oahu, which lies next to Kauai on the south-east, we find a remarkable development of the Helicidæ. The ground species belong to the two genera just mentioned, *Amastra* and *Leptachatina*. *A. ventulus* is an example of the former, and *L. vitrea* of the latter. Over twenty-five species of each have been found on this island. Two arboreal genera—the *Bulimella* (Pfeiffer) and *Helicterella* (Gulick)—are found only on this island. The ellipsoidal form, as in *B. rosea*, characterises the former; and the conical form, as in *H. apiculata*, the latter. Of *Bulimella* there are about thirty known species; of *Helicterella* thirty-five. The different species of *Bulimella* present a great variety of colours, ranging from bright green and rose, through yellow, brown, and ash, to simple black and white. The prevailing colours of the *Helicterella* are white, black, and brown, variously arranged in bands and stripes. The arboreal genus *Achatinella* (Swainson) may also be regarded as belonging especially to Oahu, as it is here represented by fifty-four species, and elsewhere by but three, which are found only on the island of Molokai, about fifteen miles to the east. *Achatinella producta*, about one inch in length, is one of the largest of the family. The *Auriculella* (Pfeiffer) is a genus of small arboreal species found on Oahu, and also on the islands to the east. Many of them are unnamed; but those on Oahu probably number more than ten. *Auriculella auricula* is given by Pfeiffer as the type. Two other arboreal genera—*Partulina* (Pfeiffer) and *Laminella* (Pfeiffer)—which find their chief development on the islands of Maui, Molokai, and Lanai, are represented on this island by three species each. The types, as given by Pfeiffer, are *Partulina virgulata*, found on Molokai, and *Laminella gravida*, on Oahu.

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